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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/635,606	08/10/2000	John C. Kralik	6536-118	7149

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EXAMINER
DUONG, THOI V

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 11/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/635,606	KRALIK, JOHN C.
	Examiner	Art Unit
	Thoi V Duong	2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 August 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities: On page 18, line 31, "transmaission" should be --transmission--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 1-8, 14-19, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Popovich (USPN 6,339,486 B1).

Popovich discloses a method of fabricating an electrooptic device 10, as shown in Fig. 1, comprising the steps of:

providing a nemalic liquid crystal (col. 8, lines 59-66);

providing a photo-curable pre-polymer mixture (col. 4, lines 50-55) ;

mixing said nematic liquid crystal with said photo-curable pre-polymer mixture to form a homogeneous nematic/pre-polymer mixture, with said nematic liquid crystal

being greater than 40% (by weight) of said combined homogeneous mixture (col. 5, lines 63-67 and col. 6, lines 1-3 and lines 34-43);

providing a cell comprising a pair of spaced apart transparent substrates 14 that are each coated with a transparent conductive layer (col. 9, lines 24-27));

filling said cell with said homogeneous nematic/pre-polymer mixture (col. 9, lines 24-27); and

photo-curing said nematic/pre-polymer mixture using a spatialty inhomogeneous illumination source thereby creating the electrooptic device in the form of a polymer dispersed liquid crystal (PDLC) exhibiting low scattering loss and high index modulation (col. 5, lines 19-23; and col. 17, lines 48-67),

wherein said nematic liquid crystal possesses a positive dielectric anisotropy (col. 12, lines 60-63);

wherein said nematic liquid crystal is a eutectic mixture (col. 6, line 56 through col. 7, line 9);

wherein said substrates are separated by approximately 5-20 micrometers (col. 7, lines 10-14); and

wherein said PDLC is comprised of a dispersion of discrete droplets containing nematic liquid crystal-rich material in a polymer-rich matrix and regions of inter-connected spaces that are filled with nematic liquid crystal-rich material (col. 11, lines 16-36).

The method further comprises the step of deriving the spatially inhomogeneous illumination source used to photo-cure the nematic/pre-polymer mixture from the

interference of two coherent optical beams within said cell (col. 9, lines 27-30), where said coherent optical beams each have a wavelength in the ultraviolet spectrum (col. 7 lines 19-36). Popovich also discloses a static optical device in the form of a polymer dispersed liquid crystal (PDLC) exhibiting low scattering loss and high index modulation (col. 17, lines 52-67).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 9-13 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Popovich in view of Sumiyoshi et al. (USPN 6,278,506 B1).

As shown in Fig. 13, Popovich further discloses a transmission grating 200 having periodic planes of polymer planes 200a and PDFC plane 200b wherein each polymer plane has a thickness t(P) and each PDLC plane has a thickness t(PDLC), and the combined thickness of the PDLC plane and the polymer plane is a grating period which is less than an incident optical wavelength to exhibit form birefringence (col. 15, lines 1-4 and col. 17, lines 1-10). Accordingly, the grating period can be selected to be greater than half the wavelength of the light to be diffracted by the PDFC transmission grating during use of said transmission grating. Popovich also discloses the transmission grating with a spatial frequency that is sufficiently high to prohibit propagating diffracted orders for normal incident light, thereby creating an electrooptic

retarder with electrically tunable birefringence (col. 9, line 64 through col. 10, lines 7; and col. 15, lines 1-15).

Popovich discloses a method of fabricating an electrooptic device that is basically the same as that recited in claims 9-13 and 20-24 except for the interfering optical beams which are incident symmetrical about a direction normal to said cell in order to form said PDLC as an unslanted PDLC transmission grating. As shown in Fig. 9, Sumiyoshi discloses a method of fabricating an electrooptic device comprised of regions of inter-connected spaces 17a, 17b that are filled with nematic liquid crystal-rich material. The method further comprises the step of deriving said spatially inhomogeneous illumination source used to photo-cure the nematic/pre-polymer mixture from the interference of coherent optical beams LB11 and LB12 within said cell as shown in Fig. 5B and 5C. Fig. 18 shows the incident angle AGL1 and the azimuth angle AGL2 of the beams wherein AGL1 of the beam LB12 is fixed to zero while the beam LB11 is incident with a certain incident angle AGL1 to produce a first multilayer structure for the mixture. Sumiyoshi further discloses that a second multiplayer structure is created in the mixture by maintaining the incident angle AGL1 and changing the incident azimuth AGL2 by 180 degrees for the beam LB11. Accordingly, an unslanted PDLC transmission grating will result when the interfering optical beams LB11 are incident symmetrically about a direction normal to said cell (col. 10, lines 15-48). Also, as shown in Fig. 8, Sumiyoshi discloses that the nematic liquid crystal in the nematic-rich regions in the PDLC contains a high degree of orientational order and has its nematic director substantially aligned along a uniform orientation OR2 in a grating layer 15f when no

drive field is applied across said cell. Since the grating layer is unslanted, its grating vector is parallel to the grating surface. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of fabricating an electrooptic device or a static optical device of Popovich with the teaching of Sumiyoshi by employing two interfering optical beams which are incident symmetrically about a direction normal to said cell in order to form said PDLC as an unslanted PDLC transmission grating so as to produce a highly bright image.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (703) 308-3171. The examiner can normally be reached on Monday-Friday from 8:00 am to 4:30 pm.

If attemps to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (703) 305-3492.

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Thoi Duong

11/10/2002